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EXAMINER	
FANG, SHANE	

ART UNIT	PAPER NUMBER
4131	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/553,449	RATZSCH ET AL.	
	Examiner	Art Unit	
	SHANE FANG	4131	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *26-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/02/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Regarding claim 26b), 29-30, 33-36, and 38-39, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

3. Claim 39 recites the limitation "R" in HO-R-OH. There is insufficient antecedent basis for this limitation in the claim.

4. Claim 41 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, it is unclear how high the molecular weight of oligomers.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 49 is rejected under 35 U.S.C. 102(b) as anticipated by **Michel et al. (US 4081426 A)**.

Michel et al. discloses a melamine resin prepared from melamine with formaldehyde and etherifying alkanol (Abstract). *Michel et al.* is silent on the process

as recited in claims 26 and 49. However, claim 49 is a product-by-process claim that are limited by and defined by the process. Determination of patentability is based on the product itself, not on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. **In re Thorpe,** 777 F. 2d 695, 698,277 USPQ 964,966 (Fed. Cir. 1985). See MPEP § 2113.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 26-32 are rejected under 35 U.S.C. 103 (a) as being unpatentable over **Berbner et al. (US 4996289 A)** in view of **Michel et al. (US 4081426 A)**.

As to claim 26a), *Berbner et al.* discloses a continuous preparation of melamine/formaldehyde resin (Abstract). *Berbner et al.* discloses placing melamine, formaldehyde, and other ingredient to a continuous mixer (Example 1) and using mono-alcohols less than 6 carbon atoms as the modifier for ether formation (Col 1, ll 45-47).

As to claim 26d), *Berbner et al.* discloses homogeneous premix (solids-poor phase) is fed to further processing steps, such as an extruder (Example 1).

As to claim 26a), the difference is *Berbner et al.* fails to place mono- alcohols with melamine and formaldehyde simultaneously in the continuous mixer. However, selection of any order of mixing ingredients is *prima facie* obvious. **In re Gibson**, 39

F.2d 975, 5 USPQ 230 (CCPA 1930). See MPEP ¶ 2144.04. As to claim 26b), the difference is *Berbner et al.* fails to disclose separation apparatus and solids-rich phase and a solids-poor phase. As to claim 26c), the difference is *Berbner et al.* fails to insoluble melamine is recovered.

As to claim 26b), *Michel et al.* discloses filtered off insoluble melamine from the reaction mixture of melamine/formaldehyde/methanol. *Michel et al.* implies the use a separation apparatus in form of filter (Example 17). The motivation, which is well-known to people of ordinary skill in the art, is to remove insoluble, agglomerated melamine that obviously lacks of reactivity compared to soluble melamine. As to claim 26c), *Michel et al.* further discloses insoluble melamine is recovered (Example 10). The motivation, which is well-known to people of ordinary skill in the art, is to increase yield by complete usage of melamine.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of *Berbner et al.* and *Michel et al.* to develop a continuous process of producing liquid melamine resin via process recited in claim 26 comprising filtration features. The suggestion/motivation would have been to improve the reactivity and yield by the complete usage of melamine monomer.

Claims 27 and 29 are rejected for the same reason applied to claim 26b). The suspension is implied to be transferred to form of filtration.

As to claim 28, *Michel et al.* implies a suspension after reaction due to the insoluble melamine (Example 10). The reaction mixture is inherently a suspension if

insoluble melamine existed. It is obvious to transport overflow reaction mixtures form stage to stage for further operation such as filtration.

As to claim 30, *Berbner et al.* discloses using mono- alcohols less than 6 carbon atoms (including methanol) as the modifier for ether formation (Col 1, ll 45-47) and formaldehyde aqueous solution (Col 1, ll 38).

Claim 31 is rejected for the same reason applied to claim 26a).

As to claim 32, *Berbner et al.* discloses the reaction in the extruder is 110-112 °C. The difference is *Berbner et al.* is silent on claimed pressure (2-30 bar). However, pressure appears to merely determine the catalyst activity for the synthesis of melamine resin. The normal desire of scientists or artisans to improve upon that is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages. **In re Peterson**, 315 F.3d at 1330, 65, USPQ2d at 1382. In this particular case, the motivation can be preventing the evaporation of low boiling point monomers (formaldehyde and methanol) and accelerating reaction.

9. Claims 33 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 26 above, and in further view of **Child et al. (US 4927977A)**.

The prior arts applied to claim 26 above teach the process recited in claim 26, where after the filtration (solid-liquid phase separation apparatus), liquid melamine resin (solids-poor phase) is fed to an extruder (continues second reaction stage) for further reaction (*Berbner et al.*, Example 1).

The difference is the prior arts are silent on using tubular reactor.

Child et al. discloses using tubular reactor for etherification (Col 4, ll 4-6). *Child et al.* further discloses the motivation of providing uniform distribution of reactants (Col 4, ll 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of the prior arts applied to claim 26 above and *Child et al.* to develop a process of producing liquid melamine resin recited in claim 26 comprising tubular reactor for etherification. The suggestion/motivation would have been to provide uniform distribution of reactants.

As to claim 37, *Michel et al.* implies using acid as the catalyst (Col 1, ll 30) and adding nitric acid (Example 17), which is homogeneous with the reaction mixture. The difference is *Michel et al.* fails to disclose adding acid before the polymerization (second reaction stage). This claim is rejected for the same reason as applied to 26a).

10. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 33 above, and in further view of **Lee et al. (J. Microencapsulation, Sept., 2002, vol. 19, no. 5, 559-569)**.

The prior arts applied to claim 33 above teach the process recited in claim 33. *Michel et al.* discloses the reaction is carried out in acidic condition (Col 2, ll 37).

The difference is the prior arts fail to disclose the claimed pH range recited in claim 34.

Lee et al. discloses the polymerization of melamine/formaldehyde under pH condition of 5, 5.5, and 6 (Pg 560, bottom). *Lee et al.* further implies the motivation of

using the disclosed pH range to obtain optimal combination of methylene and ether bridges with optimal solubility (Pg 565, bottom)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of the prior arts applied to claim 26 above and *Lee et al.* to develop a process of producing liquid melamine resin recited in claim 33 with polymerization pH condition recited in claim 34. The suggestion/motivation would have been to obtain optimal solubility of reaction mixture.

11. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 33 above, and in further view of **Donaldson (US 3488350 A)**.

The prior arts applied to claim 33 above teach the process recited in claim 33. *Michel et al.* discloses the reaction is carried out in acidic condition (Col 2, ll 37) and implies using acid as the catalyst (Col 1, ll 30).

The difference is the prior arts fail to disclose use acidic ion exchanger recited in claim 35.

Donaldson discloses using acid cationic exchange resin for preparing polyalkyl ethers of polymethyol melamine (liquid melamine resin) (Title). *Donaldson* discloses the motivation of reducing reaction steps (Col 3, ll 25-30). The acid cationic exchange resin is heterogeneous with the reaction mixture, as evident by particle size of crosslinked solid resin described in Col 3, ll 48-50.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of the prior arts applied to claim 33 above and *Donaldson* to develop a process of producing liquid melamine resin

recited in claim 33 with acid cationic exchange resin is used. The suggestion/motivation would have been to obtain reduce reaction steps.

12. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 33 above, and in further view of **Gilmore (4112520 A)**.

The prior arts applied to claim 33 above teach the process recited in claim 33.

The difference is the prior arts fail to disclose use mixing element such as static mixer recited in claim 35.

Gilmore discloses static mixer. *Gilmore* discloses the motivation of using static mixer to improve mixing efficiency (Col 1, ll 10-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of the prior arts applied to claim 33 above and *Gilmore* to develop a process of producing liquid melamine resin recited in claim 33 comprise mixing element such as static mixer. The suggestion/motivation would have been to improve mixing efficiency.

13. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 33 above, and in further view of **Housekeeper (US 4112520 A)**.

The prior arts applied to claim 33 above teach the process recited in claim 33.

The difference is the prior arts fail to disclose after polymerization (second reaction stage), a pH of more than 9 is established by sodium hydroxide recited in claim 38.

Housekeeper discloses process of making melamine/formaldehyde, wherein sodium hydroxide is used to adjust pH to 11 after polymerization (Example 6). *Housekeeper* further discloses the motivation of neutralization (Col 4, ll 39-41).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of the prior arts applied to claim 26 above and *Housekeeper* to develop a process of producing liquid melamine resin recited in claim 33 wherein sodium hydroxide is used to adjust pH more than 9 after polymerization. The suggestion/motivation would have been to neutralize the reaction mixture.

14. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 33 above, and in further view of **Child et al. (US 4927977A)**.

Disclosures of *Berbner et al.*, *Michel et al.,* and *Child et al.* are adequately set forth in paragraph 9 and are incorporated herein by reference.

As to claims 39, *Michel et al.* discloses evaporation after polymerization (for concentration) (Example 19). *Berbner et al.* discloses adding modifier of monoalcohol and diols less than 6 carbon atoms (Col 1, ll 45-46) to melamine resin and reacted in twin-screw extruder (kneader, Example 1). All references are silent on adding alcohols before, during, and/or after concentration. However, this claim is rejected using the same case law applied to claim 26a).

15. Claims 40, 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 39 above, and in further view of **Child et al. (US 4927977A)**.

Disclosures of *Berbner et al.*, *Michel et al.,* and *Child et al.* are adequately set forth in paragraph 14 and are incorporated herein by reference.

As to claim 40, *Berbner et al.* discloses adding modifier of diols less than 6 carbon atoms (Col 1, ll 45-46). Note HO-Bu-OH is a species recited in claim 40.

As to claim 42, *Michel et al.* disclose the reaction is carried out in acidic condition (Col 2, ll 37). All references are silent on the order of adding acids. However, this claim is rejected using the same case law applied to claim 26a).

As to claim 43, all references are silent on obtaining 95-99% concentration. However, this claim is rejected using the same case law applied to claim 32. In this particular case, the motivation can be eliminating solvent residue.

As to claim 44, *Michel et al.* discloses evaporation after polymerization (for concentration) (Example 19). All references are silent on two-stage evaporation. However, duplicating the evaporation step is simply optimization of a known process. The claimed invention would have been obvious if combining prior art elements according to known methods to yield predictable results. See MPEP ¶ 2141.

16. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 39 above, and in further view of **Kumar et al. (*Macromolecules*, 1990, 23 (16), 3729-3736)**.

The prior arts applied to claim 39 above teach the process including etherification of melamine recited in claim 39. *Berbner et al.* further discloses the oligomer (Col 1, ll 39).

All references fail to teach molar masses (500-2500) and tris(methoxymethylamino)triazine.

However, in the process of formaldehyde-melamine synthesis, etherified melamine inherently contains oligomers with molar mass of 500-2500 and tris(methoxymethylamino)triazine where methanol is also used and disclosed by aforementioned reference. This is evident by the disclosure of *Kumar et al.*

Kumar et al. discloses common forms of methylolated melamine formaldehyde form (Pg. 3730, Fig. 1, left middle). It is obvious to people of ordinary skill in the art that said structure can be fully alkylated with methanol to form tris(methoxymethylamino)triazine. *Kumar et al.* further discloses melamine oligomer (Pg. 3730, ll 5, ¶ 1 and structure in equation (3), Pg. 3729, bottom). Note the molecular of a dimer of said oligomer is calculated as 677 g/mol.

Therefore, one ordinary skill in the art would expect that the process and motivation disclosed by the reference applied to claim 39 would inherently result in an etherified melamine resin having the same molar masses and resultant alkylated product of tris(methoxymethylamino)triazine as recited in claim 41.

17. Claims 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 39 above, and in further view of **Wang et al. (US 6107405 A)**.

The prior arts applied to claim 39 above teach the process recited in claim 39. *Berbner et al.* discloses use self-purging twin-screw extruder having a drive motor (continuous operation) (Col 2, ll 36-37).

The difference is the prior arts fail to disclose extruder having vacuum devolatilization zones.

Wang et al. discloses twin-screw extruder with vacuum devolatilization (Example 1). The motivation, which people of ordinary skill in the art, is to remove of solvent residue and volatiles.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of the prior arts applied to claim 26 above and *Wang et al.* to develop a process of producing liquid melamine resin recited in claim 39 wherein self-purging twin-screw extruder having vacuum devolatilization zones is used recited in claims 45-46. The suggestion/motivation would have been to remove of solvent residue and volatiles.

18. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 39 above, and in further view of **Ehman et al. (US 6107405 A)**.

The prior arts applied to claim 39 above teach the process recited in claim 39. *Berbner et al.* further discloses addition emulsifiers and blowing agents (processing auxillaries) and filers.

The difference is the prior arts fail to disclose adding reactive polymers, stabilizers and UV absorbers as recited in claim 47.

Ehman et al. discloses blending melamine-formaldehyde resin with tris(alkoxycarbonylamino)triazine derivatives (stabilizers and UV absorbers, motivation), transesterification crosslinking agents such as polyesters, and etc, which can give rise

to highly crosslinked coatings with or without the action of catalysts (motivation, Col 10, ll 3-9).

All references are silent on the claimed rang of fillers (75%) and stabilizers and UV absorbers (2%). However, this claim is rejected based on the same case law applied to claim 32. In this particular case, the motivation can be obtaining desirable mechanical properties of resultant composite.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of the prior arts applied to claim 39 above and *Ehman et al.* to develop a process of producing liquid melamine resin recited in claim 39 blending with other components recited in claim 47. The suggestion/motivation would have been to obtain desirable mechanical properties, UV stability, and self-crosslinking capability in the resultant composite.

19. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior arts applied to claim 33 above, and in further view of **Katsurayama (JP 04255304A)**.

The prior arts applied to claim 33 above teach the process recited in claim 39.

The difference is the prior arts fail to disclose granulates recited in claim 38.

Katsurayama discloses melamine resins is kneaded, and extruded, and crushed and granulated for shot blasting application (motivation, Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated disclosures of the prior arts applied to claim 26 above and *Katsuyama* to develop a process of producing liquid melamine resin

recited in claim 39 followed by granulizing. The suggestion/motivation would have been to make high quality shot blasting material.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHANE FANG whose telephone number is (571)270-7378. The examiner can normally be reached on Mon.-Thurs. 8 a.m. to 6:30 p.m. EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571)272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ling-Siu Choi/
Primary Examiner, Art Unit 1796

sf